

REMARKS

Claims 1, 2, 5-9 and 12-17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz (U.S. Patent No. 4,539,106) in view of Tucci et al. (U.S. Patent No. 4,320,010).

Schwartz discloses a system and apparatus for water conditioning that utilizes two tanks, one of the tanks is for service and the other tank is for regeneration. In the summary section of the specification, there is only a cursory mention of using hardness sensors, along with other equipment, to activate transfer from an expended tank to a recharged twin-tank and providing an improved manner of regenerating the expended tank, then holding it in readiness until another cycle is needed.

Tucci et al. disclose a regeneration detector for water softeners. A tank holds the ion exchange bed and has at least two electrodes that are disposed in the tank. As hard water is continuously introduced into the tank, the "hardness front" progresses slowly downward at a rate generally determined by the flow volume and the hardness of the water being treated. As this front moves through the bed, a substantial, measurable change occurs in the potential difference existing between electrodes and thus, permits it to accurately monitor the progress of the hardness font through the tank.

There are a number of differences between the present invention and the Tucci et al. reference and some of these features are presented in the amended claims. One difference is the manner and method of monitoring the hardness component concentration. In the present device, the hardness component concentration for each water collection amount is calculated by withdrawing a water sample through the sampling conduit from the respective tank. In other words, a conduit (sampling pipe) is provided and is in communication with an interior of the tank for withdrawing the water sample to the hardness measuring device. More specifically and in contrast to the Tucci et al. device, water is withdrawn from the tank and delivered to the measuring device as opposed to merely measuring the electric potential between spaced electrodes that are disposed in the tank as in the cited reference. In the cited Tucci et al. reference, there is no water collection amount that is taken from the main tank and delivered to the detection device (measuring device). Thus, the construction of the tank and associated equipment and the process of withdrawing a collection

amount which is then tested at the measuring device are different than the process disclosed in the cited reference.

In sum, there is no teaching or motivation in the Tucci et al. reference for withdrawing a collection sample for analysis and actually the opposite is true in that such an arrangement is directly contrary to the teachings of Tucci et al. of providing a consolidated device where detection and measurements are done with electrodes positioned right in the tank itself.

Based on the aforementioned, Applicants respectfully request reconsideration and allowance of claim 1, as amended.

Independent claim 8 recites a water softening method. Applicants have amended this claim to include the steps that each of the water softeners has a sample conduit in fluid communication therewith for collecting a sample of treated water and further the step of withdrawing the sample of treated water from one of the first and second water softeners by means of the respective sample conduit. The step of detecting the hardness of the water has been amended to recite that the detection device is in fluid communication with the sample conduit and receives the sample of treated water therefrom.

Applicants respectfully submit that claim 8 has been amended to include the basic features that have been added to claim 1 in the present amendment and therefore, Applicants respectfully request reconsideration and allowance of amended claim 8 for the same reasons discussed above with respect to amended claim 1. In other words, amended claim 8 recites a number of steps that are neither disclosed nor suggested in any of the prior art references.

Independent claim 15 has been amended in the same manner as claim 1 was amended and therefore, Applicants respectfully submit that claim 15, as amended, should be allowed for the same reasons recited above with respect to why amended claim 1 should be allowed.

Claims 3, 4, 10, 11, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz and Tucci et al. and further in view of Tanabe et al. (U.S. Patent No. 5,811,012).

Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz, Tucci et al. and Tanabe et al. and in further view of Banham et al. (U.S. Patent No. 5,639,377). These rejections are now moot in view of the present amendments since none of these secondary references discloses or suggests the features added in the present amendment.

Claims 2-7, 20, and 21 should be allowed as depending from what should be an allowed independent claim 1, as amended. Claims 9-14, 22 and 23 should be allowed as depending from what should be an allowed independent claim 8, as amended. Claims 16-19 should be allowed as depending from what should be an allowed independent claim 15, as amended.

Applicants have amended the claims by adding a number of new claims that further differentiate the present invention over the devices disclosed in the cited references. For example, claim 24 discloses that the hardness detection device includes: (1) a chamber for collecting the sample of treated water; (2) a hardness component measuring device in fluid communication with the chamber via a connector conduit; and (3) a pump associated with the connector conduit for delivering the sample of treated water to the measuring device at a constant pressure and constant flow. No new matter is introduced since antecedent support is found at page 14, lines 3-8. Applicants respectfully request that these arrangement is neither disclosed nor suggested by the cited references. Once again, in Tucci et al., the detector (sensors) is located within the tank and there is not such thing as a water sample that is collected and removed from the tank and then delivered to the detector. The cited references are silent as to a system where a collection sample is introduced to the measuring device under constant flow and pressure. As a result, the measuring errors of the measuring device can be prevented so that it is possible to catch any hardness leaks accurately.

Claims 25-26 also add features that are neither disclosed nor suggested by the cited references. For example, these claims recite that a means for maintaining the sample of treated water at a constant temperature and more particularly, that the means is formed of a heat exchanger. These features are not disclosed in the cited references.

Claims 27-29 are similar to claims 24-26.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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